SIR VICTOR HORSLEY, F.R.S.

Sir Victor A. H. Horsley, whose death on July 16 we record with the deepest regret, was born in 1857 of a family long distinguished for ability in natural science and the arts. His descent was chosen by Galton to illustrate the view that unusual talents are hereditary in certain stocks of the community in this island.

On leaving school he entered University College, and carried all before him. He early showed his interest in the physiology of the nervous system, and in 1884 published a study, with Prof. Schäfer, on the functions of the marginal convolution. The same year, at the early age of twenty-seven, he was appointed professor-superintendent of the Brown Institution, a post much coveted by physiologists. His energy and enthusiasm, coupled with his astonishing youth, were a revelation to all who came into contact with him. In his company work became a fascinating game, and never was there such a keen playmate. He was singularly attractive, with a charming voice and infectious laugh; his manner was boyishly unaffected, and as he struck out one line after another in the application of physiology to medicine our enthusiasm was unbounded. He was always sincerely interested in the work of others, and would devote much time and energy to understanding it thoroughly. Throughout his period at the Brown Institution he worked more particularly at hydrophobia, and the functions of the thyroid and pituitary body, besides continuing his studies in cerebral localisation.

Horsley was surgeon to University College Hospital and to the National Hospital for the Paralysed and Epileptic, Queen Square, W.C., and it was at this time that he became the pioneer of surgery of the central nervous system. Instigated by Dr. Hughlings Jackson and Sir William Gowers, he was the first successfully to operate on the brain and to remove a tumour pressing on the spinal cord. To us his operating was an inspiration; he was never at a loss, and his brilliancy lay rather in his attitude to the problem in front of him than in pure mechanical dexterity. He was never afraid, and the complete reliance he placed on his subordinates was sometimes almost embarrassing.

Honours poured upon him. He was early elected a Fellow of the Royal Society, and obtained the Royal medal; Halle made him an M.D., Paris elected him a Fellow of the Académie de Médecine, and numerous medical societies all over the world claimed him as an honorary member. No British worker in his field has been so much admired on the Continent as Horsley.

Practice came to him abundantly, but until shortly before the war he always devoted one day in the week to work in his private laboratory, tucked away under the lecture theatre at University College. Here he did all his work on the functions of the brain, including the long series of researches with Dr. R. H. Clarke on the cerebellum, carried out with an accuracy never before attainable. Many younger men who are now distinguished as neurologists in different parts of the world came to work with him here in London, and owe the success of their researches not only to his guidance, but to his remarkable operative skill on animals, for in almost all cases the actual experimental lesions were his handiwork.

He was Croonian lecturer to the Royal Society, and on this occasion published the work carried out with his brother-in-law, Prof. Gotch, on electrical changes in the spinal cord.

He was, however, essentially a pioneer, interested mainly in working at a subject until the field was laid open to all. This accounts for the comparatively small bulk of his publications. He showed all the surgeons of the world how to operate on the brain and spinal cord, but left no co-ordinated account of his methods, procedure, or results. This was in part due to impatience at being forced to go back over the road he had travelled, and partly to the overwhelming worries of the political and social work into which he threw himself with all his original scientific ardour.

His death was characteristic of his desire always to be moving forwards, to be in the advance, for, as consulting surgeon and inspector of hospitals, he might have stopped in the Mediterranean, where he had been occupied usefully for some time. But he demanded to be sent to Mesopotamia, where he knew the need was urgent, and there he died at Amara, laying down his life at the early age of fifty-nine.

H. H.

NOTES.

The death of Sir William Ramsay on July 23 has deprived the world of one of its greatest men and science of a pioneer whose work has opened up the richest fields of research explored in modern times. For several months the sympathies of scientific men have been with Sir William on his bed of affliction, and rebellious thoughts have surged through the minds of all of us that such an intellectual giant should have been rendered helpless when his dominating influence was most needed in national life. Though he was sixty-three years of age, he was much younger in spirit and vigour; and until last November everyone who knew him supposed that he had a long period of activity still in front of him. He has now passed to his rest, and no words can express the grief felt by his countless friends and admirers at the loss sustained by them and by the nation. His genius was undoubted, and in personal characteristics, as well as in productive work, he represented science at its highest and best. His funeral is taking place at Hazlemere Church, High Wycombe, as we go to press, but the place where his remains should rest is Westminster Abbey, for the honour which he brought to his country would have been justly recognised by this mark of national recognition. The greatness of his work, and the high regard in which it is held, were shown in an article on Sir William Ramsay in our series of "Scientific Worthies" in Nature of January 11, 1912. His memory will be cherished with affection by all who came under the influence of his attractive personality, and his contributions to knowledge will constitute a permanent monument to him in the fields of science. The nation itself has been exalted by his achievements, and a memorial of them should be placed where all may see and be uplifted by the spirit of scientific life so fully manifested in him.

An instructive example of the manner in which Germany has in the past been permitted to exploit British resources is provided by the management by a German company of the Travancore monazite deposits. The sand was obtained in Travancore at a cost of about 4*l.* per ton, and shipped to Germany for the use of the manufacturers of Germany. Only a limited quantity of the sand was allowed to be sold in the United Kingdom, and the price of about 36*l.* per ton was demanded. In a paper on the British rare-earth industry, read by Mr. S. J. Johnstone at the annual meeting of the Society of Chemical Industry, these and other interesting particulars were given. Prof. Wyndham Dunstan, director of the Imperial Institute, dealt with the same subject in a paper read to the Indian Section of the Royal Society of Arts on June 1, and printed in the issues of the society's journal of July 7 and 14. Thorium, the constituent of monazite of industrial importance, is essential to the gas-mantle industry, which until lately was under German control. Germany, having secured the monopoly of the Brazilian supplies of monazite, was able to dominate the manufacture of gas mantles in this country. Owing to the activities of the Imperial Institute, Ceylon was found to supply scattered monazite and thorianite, the richest known ore of thorium, containing more than 80 per cent. of thoria, as against about 5 per cent. in Brazilian monazite. In 1909 monazite sand was discovered on the coast of Travancore, and the monazite found to contain nearly twice as much thoria as the monazite of Brazil. Thorianite has been secured by the Imperial Institute for British users, by whom virtually the entire output of Ceylon has been taken. Though at first Travancore monazite was worked in German interests, a reconstruction since the war of the company working it will secure its produce also for British industry.

As was the case last year, the Swedish Government has decided to postpone, this time until July 1, 1917, the distribution of the Nobel prizes in physics, chemistry, medicine, and literature.

The Finsbury Technical College Old Students' Association is preparing a scheme to perpetuate the memory of the late Prof. Silvanus P. Thompson in a suitable manner. All who wish to assist in the establishment of such a memorial should communicate with Mr. J. E. Raworth, Queen Anne's Chambers, 28 Broadway, Westminster, London, S.W.

The death is announced, at the age of seventy-eight, of Dr. Bushell Anningson, lecturer in medical jurisprudence in the University of Cambridge since 1884. Dr. Anningson was the author of "Evolution of Human Communities in Relation to Disease," "The Origin and Progress of Sanitary Endeavour," and other works.

Lieut. J. J. Ball, who was killed at the front on June 27 while acting as observing officer, entered the University of London, University College, as a student of civil engineering in 1912, and had just completed his second year's course at the outbreak of the war. He was by no means a "bookworm," but perhaps his distinguishing feature as a student was the quiet determination with which he tackled his studies, even when they were clearly distasteful. His friends and teachers at University College feel that by his death the war has robbed them of a promising young engineer, as well as of a man they were glad to call friend.

Major (Temporary Lieut.-Col.) Boyd Robert Horsbrugh, who died recently at his home, Oxted, Surrey, was well known as an authority on the birds of South Africa, where he had lived for nearly seven years, and had travelled extensively throughout the country; he also served with distinction in the South African war. He is best known as the author of a book on the "Game Birds and Waterfowl of South Africa," published in 1912, a most useful work to the naturalist, but mainly designed to meet the requirements of the average sportsman in that country. A special feature of the work is the field notes by the author and artist, and the beautiful series of coloured plates by Sergt. C. G. Davies, Cape Mounted Riflemen, which bear evidence of being drawn from life by one who had watched and studied in their native haunts the subjects of his pencil.

The death of Paul Lemetayer in Chile closes a most useful career. Born at Avranches in 1849, he was the pupil and later the collaborator of Paul Issidor. In 1881 he was appointed director of the agricultural station at Santiago, and held a distinguished position in connection with agricultural and analytical chemistry in Chile. As technical adviser to the Government, Lemetayer contributed much to the welfare and progress of Chile. The important nitrate industry, the growth of sugar-beet, and the development of vineyards have been specially encouraged by State grants, but agricultural enterprise has also been stimulated in other directions. The "Quinta Normal d'Agricultura," with which Lemetayer was closely connected, is regarded as the largest and best organised of agricultural schools in South America, and is rivalled by few similar institutions in Europe.

Mr. Edgar Albert Smith, who died on July 22, was born in 1847. His father was Frederick Smith, a well-known entomologist, and assistant-keeper in the zoological department of the British Museum. In 1867 Edgar Smith joined the staff of the museum as an assistant, and took charge of the mollusca; for several years he was largely occupied with the arrangement of the famous "Cuming Collection." Afterwards, when the collections were transferred from Bloomsbury to South Kensington, he was responsible for the arrangement of the shell gallery, which he planned especially for the convenience of the numerous amateur collectors and students of shells who visited the Natural History Museum, and at whose service he freely placed his wide knowledge and experience. In 1895 he was promoted to the rank of assistant-keeper, and in 1903 he received the I.S.O.; he retired in 1913. Mr. Smith was recognised as a high authority in conchology, and he was the author of more than 300 monographic and faunistic works on mollusca, including the important volume on the *Challenger* Lamellibranchs. He had held the office of president of both the Conchological and Malacological Societies, and was a member of the Academy of Natural Sciences of Philadelphia and of the Linnean Society of New South Wales.

Capt. J. M. Charlton, who was killed on July 1, at twenty-five years of age, was an enthusiastic naturalist and amateur taxidermist, and had written and illustrated several short works on ornithology, among them "The Birds of South-East Northumberland." He was in Uppingham School from 1907 to 1910. During his last two years there he was one of the official "observers" of the Ornithological Section of the Natural Science Society, and for his last year he was secretary of the section. He was always very keen on birds, spent all his spare time in observing them, and would travel miles on the off-chance of seeing anything novel to the district. He had also artistic power, and in 1908 was awarded first prize in the school exhibition for some coloured studies of birds. In the Public Schools Essay Competition of 1910 he was awarded a special bronze medal for his essay on "Observations during a Fortnight's Holiday on the Island of Gigha."

It is officially announced that in view of the possibility of the failure of the third attempt now being carried out by Sir Ernest Shackleton, in a small vessel, to rescue the twenty-two men of his party left on Elephant Island, South Shetlands, and at his urgent request, the Government has now decided to dispatch a vessel from England as soon as she can be fitted out, no suitable wooden vessel being available in any South American port. The Governor and Company of Adventurers of England Trading into the Hudson's Bay have generously placed their vessel, the *Discovery*, which was specially built for Antarctic exploration, at the disposal of the Admiralty, for as long as she may be required for this service, free of all cost. Lieut.-Commander James Fairweather has been appointed to command the vessel, which is now fitting out at H.M. Dockyard, Devonport. On her completion, if news has not been received of a successful issue of Sir Ernest Shackleton's present attempt to reach Elephant Island, she will then proceed to Elephant Island, embarking Sir Ernest Shackleton on her way.

At the meeting of the City of London Court of Common Council on Thursday, July 20, it was resolved:—(1) That in view of the great advantages which would accrue to British commerce in foreign markets by the use of the decimal system of coinage and weights and measures, in the opinion of this court it is desirable that steps should be taken to ensure its immediate introduction, so that it may be already in operation at the conclusion of the war; (2) That in view of the fact that England and the Allies are entering into arrangements for concerted action with regard to future trade matters, it would be of immense value if one language could be recognised as the commercial language, and taught in all schools, here and abroad. By so doing, English, French, Russian, Esperanto, or any other language decided on would form the basis of communication on business matters throughout the world.

At the beginning of July a party of thirty men, led by Mr. Birger Johnsson, left Sweden for Spitsbergen in order to work the coal deposits at the head of Bell Sound (Braganza Creek) and Isfjord. At Braganza Creek the coal, though of Tertiary age is said to be of good burning quality, and there is an average thickness of 2·15 metres over an area of about 100 kilometres. At the Pyramid Hill and in Bünsow's Land, at the head of Isfjord, on the other hand, the coal is culm of Carboniferous age, and is not so good as at Braganza. None the less, these two areas are calculated to yield about 3000 million tons of good coal. Other members of the expedition are Mr. S. Öhman, who will be responsible for the mapping; Mr. H. Odelberg, agronomist, who will see to the provisioning; Mr. E. Lundström, who will serve as botanist and make a map according to Prof. De Geer's photographic method; and a palæontologist, Mr. Erik Andersson, of Upsala, who was recently studying the fossil fishes of Spitsbergen in the British Museum. Mr. Lundström is taking some plants to see if they will grow there. Among them are various willows, the dwarf birch, *Convolvulus sepium, Potentilla fruticosa,* and *Papaver nudicaule.*

Of great interest to zoologists is the proposal, reported in the June number of the *Bul. Imp. Acad. Sci.,* Petrograd, to establish a biological station on Lake Baikal. The largest of the fresh-water lakes of Europe and Asia, and said to be the deepest in the world, it possesses a fauna in many respects unique. Some of its fishes are found nowhere else, and some live at a greater depth than any other fresh-water fishes. Among them are very ancient forms, and, according to some investigators, vestiges of the Upper Tertiary and sub-tropical fauna of Siberia and, possibly, of Central Asia. Though Lake Baikal has long since attracted the attention of Russian zoologists, much remains to be done, and it is felt that private research, valuable as its achievements have been, should be supplemented by a fully equipped biological station, which alone can cope with the problems involved in a thorough and systematic investigation. The subject has been mooted for some time past in Russian scientific circles and is now brought within measurable distance of realisation by a donation of 1600*l.* received from a Siberian gentleman, Mr. A. Vtorov, and the Academy has appointed a commission to take immediate steps to give concrete form to a project destined to be of great importance for biological science.

In the July issue of *Man* Mr. J. Reid Moir publishes a further report on the discovery of human bones and other articles of Neolithic and later date in the Ipswich district. The skeleton of an individual buried in the contracted posture has been examined by Prof. Arthur Keith, who reports that it is that of a lad of the Neolithic age, decidedly smaller and of slighter make than a modern boy. Of another skull Prof. Keith remarks that "amongst British skulls, attributed to a prehistoric or pre-Roman date, a markedly prominent nose is very rare: I have never seen a single case." As regards the stature and muscular development of some of these skeletons, it is to be regretted that, although the skeleton was represented in each case, the long bones were so fragile and fragmentary that it was found impossible to obtain complete reconstruction.

We have received from the National Clean Milk Society copies of two publications just issued by the society. One is a leaflet intended for distribution among producers of milk, containing recommendations for the care of cows and of milk which should be observed by farmers and dairymen. These are simple and capable of being carried out by all, and if observed would do much to ensure a clean milk supply. The other publication is a form of agreement for the wholesale purchase and sale of milk by institutions, dealers, and milk producers. In particular it provides for the tuberculin testing of all cows and for a bacterial content of the milk not exceeding 60,000 bacteria per cubic centimetre. This last provision is certainly a very stringent one, and difficult to attain; unless the conditions of bacteriological examination are very carefully defined it will lead to trouble, for American investigations have recently shown an extraordinary variation in the bacterial content of the same milk sample examined by different observers. The agreement is, however, for a high-grade milk, the price of which is put at 3*d.* per gallon more than that of ordinary or market milk.

The need of a publication in English which will contain not only abstracts of purely physiological papers, but also summaries of important papers bearing on physiology in other branches of science, has long been recognised. It is hoped that the *Physiological Abstracts* will meet this need, and will also form a link between British and American physiologists and their colleagues in France, Russia, Italy, Scandinavia, and Holland. The abstracts are issued by the Physiological Society of Great Britain and Ireland, under the able editorship of Prof. W. D. Halliburton, and with the co-operation of the American Physiological Society; associated with the editor are many of the most eminent physiologists in this and other countries. The publication is issued monthly, and although, up to the present, only four numbers have appeared, there is no doubt as to its value for purely physiological workers. Indeed, its success appears to be assured, not merely from a scientific point of view, but also as regards its wider purpose of more closely uniting physiologists in the allied and neutral countries.

MENTION has already been made in these columns of the very useful and comprehensive survey of the phenomena of light production by animals which Mr. Ulric Dahlgren is publishing in the Journal of the Franklin Institute of Pennsylvania. In the May and June numbers he proceeds with his task, surveying now the marine worms and the crustacea. The author makes no claim to originality in regard to this work, but he has added materially to our knowledge of the histological structure of these light-producing tissues. Particular attention is directed to the difficulty of finding any satisfactory interpretation as to the significance of the extraordinary luminosity of Chætopterus, one of the most luminous of living animals, but which, like the mollusc Pholas, endowed with like powers, lives in a burrow on the sea-floor. In some of the crustacea a luminous discharge is made which seems to serve, like the ink of the cuttle-fish, as a means of escape from enemies.

THAT the maple aphis (*Chaitophorus aceris*) gives rise to dimorphic larvæ, the one normal, the other having a tessellated carapace, and the abdomen, anterior border of the head, and the limbs fringed with small leaf-like expansions, has long been known. When first discovered, however, this curiously modified type was regarded as representing a distinct species. In the Proceedings of the South London Entomological and Natural History Society, 1915–16. Mr. E. J. Bunnett reviews the work of earlier observers, and adds some valuable observations of his own, based on specimens bred from two black apterous females during June, 1914. In the course of his investigations he was further enabled to show that this "pseudomorphic," or periphyllous, form is produced also by the winged black form. An admirable figure of this most puzzling larva compared with the normal form adds immensely to the value of this contribution.

No. 3 of vol. iii., series ii., Fishery Investigations, Board of Agriculture and Fisheries, has just been published. It is an analysis and review of the English plaice-marking experiments carried out in the North Sea since 1903. In the course of this work more than 17,000 living plaice were marked and liberated. The objects of the investigation were mainly the detection of migrations and of their causes, an estimate of the rate of growth of the fish in different seasons and areas, and an estimate of the actual effect of fishing upon the North Sea plaice population. In spite of the large mass of material dealt with, it has not been possible to attain to very definite conclusions with regard to these questions. The movements of plaice in the North Sea are rather of the nature of general dispersions than of movements along definite paths, correlated with seasonal conditions. Growth, too, is remarkably variable. An important and interesting result apparent from the experiments is the practicability of carrying out "transplantation" on a very large scale with valuable commercial results. In such areas as that of the Dogger Bank growth is much more rapid than in the coastal areas, and removal of small fish from the latter to the former grounds would be an economically valuable proceeding if possible on an international scale.

IN the *National Geographic Magazine* for May Mr. Hiram Bingham, director of the expedition sent to Peru in 1915 by the National Geographic Society and Yale University, gives an account of the operations. Its main object was to secure information about the inhabitants of the wonderful city of Machu Picchu, which was discovered during the exploration of 1911. Several ancient Inca trails leading to the city were examined, and it was ascertained that Machu Picchu was the centre of a densely populated region, the inhabitants of which possessed a highly organised civilisation. Amongst other discoveries, a considerable number of trepanned skulls were found. It is remarkable that a people capable of constructing these fine megalithic buildings, and whose skill in engineering, pottery, and textiles was of a high order, should not have succeeded in inventing an alphabet or even some form of hieroglyphic writing similar to that which existed in Mexico and Central America. The report is illustrated by an excellent collection of photographs.

WE have received the report of the Survey of India for 1914-15, which shows considerable progress despite the shortage of staff. Of the 1-in. map 154 sheets were published during the year, of the "degree" sheets seven, and of the "one-millionth" map five sheets. A preliminary edition of the map of Tibet, on a scale of 1 to 2,000,000, has been published. The Government of India has sanctioned the publication of a new "half-inch" map of India, which is to be compiled from available sources. One sheet has, so far, appeared, but several new sheets should be ready shortly. In addition to this work, a great deal of topographical survey was done during the year. Quicker progress in survey work can be expected in future years, as it has been decided to reduce the scale for certain sparsely populated areas. About half of the 600,000 square miles that remain are to be surveyed for a half-inch or smaller scale.

COMMUNICATIONS No. 147 and 148 from the University of Leyden contain new data obtained by Prof. Onnes and his pupils with regard to the behaviour of oxygen, nitrogen, neon, and helium at low temperatures. For helium the vapour pressure varies with absolute temperature as follows:—At 1·48° $p=0{\cdot}42$; 3·52°, 36; 4·20°, 75·8; 4·9°, 133; 5·16°, 167 cm. of mercury. For neon the isothermals at 20° C., 0°, $-183°$, $-200°$, $-208°$, $-213°$, and $-217{\cdot}5°$ are given, and liquid neon is shown to provide a much-needed constant temperature bath in the gap between 55° absolute, which is furnished by liquid oxygen, and 20° absolute, for which liquid hydrogen is available. The behaviour of neon corresponds closely with that of argon. The previous vapour pressure tables of oxygen and nitrogen are corrected according to the most recent comparisons of the platinum with the hydrogen thermometer, and for oxygen vapour pressures are given from 90·2° absolute when the pressure is 76·7 cm., down to 57·4° when it is 0·27 cm. For nitrogen vapour pressures are given from 80·5° when $p=108{\cdot}6$, down to 57°, at which it is 2·2 cm. of mercury.

MR. A. B. DOBROWOLSKI has recently contributed to the *Arkiv för Kemi, Mineralogi och Geologi* (vol vi., No. 7, pp. 1–53), under the title "Les cristaux de glace," an interesting *résumé* of what is as yet known of this the commonest of substances, in which he points out the lacunæ that remain and the questions that are still unsettled. He has himself studied no fewer than 3000 photomicrographs of actual ice crystals under the microscope, the photographs being taken from the fine collections formed by A. W. Bentley, G. Nordenskiöld, and F. Hallberg. There appear to be three different types of habit of natural crystals of ice, viz. lamellar, rod-like, and acicular, of which the first is by far the commonest. The author hazards the suggestion that the other two result from the transitory presence in the air of certain unstable gases, but hesitates to say which From a study of the tapering, rod-like crystals he concludes that ice belongs to the tourmaline class of the hexagonal system, which is characterised by a trigonal polar axis of symmetry. No measurements which will permit of the determination of a satisfactory value for the ratio of the crystallographical axes have yet been published; that quoted in the textbooks is based upon some extremely rough observations made by Nordenskiöld, and is quite untrustworthy. In the rod-like and acicular types twinning about 0001 is common, as is shown by the existence of groups in which two tapering ends are aligned in contact. It is well known that laboratory experiments have produced different kinds of crystals of ice. For instance, water when containing more than 50 per cent. of alcohol forms cubic crystals on freezing. For a smaller percentage such crystals, if formed, are unstable, and their occurrence in Nature would therefore appear doubtful. Certain photomicrographs taken by Bentley and by Hallberg appear to suggest cubic symmetry, but, failing optical tests, it remains uncertain whether they may not be merely distorted forms of the ordinary type of crystals.

THE following volumes are announced for early publication in the "University of Chicago Science Series" by the University of Chicago Press (London: Cambridge University Press):—"The Origin of the Earth," T. C. Chamberlin; "The Isolation and Measurement of the Electron," Prof. R. A. Millikan; and "Finite Collineation Groups," Prof. H. F. Blichfeldt. Other volumes in preparation for the same series are:—"The Evolution of Reptiles," S. W. Williston; "Food Poisoning," E. O. Jordan; "The Problem of Individuality in Organisms," C. M. Child; "The Development of a New System of Organic Chemistry, based on Dissociation Concepts," J. U. Nef and J. W. E. Glattfeld; "The Living Cycads," C. J. Chamberlain; "Mechanics of Delayed Germination in Seeds," W. Crocker; "The Rigidity of the Earth and of Materials," A. A. Michelson; "The Problem of Fertilization," F. R. Lillie; and "Linear Integral Equations in General Analysis," E. H. Moore.

MESSRS. CONSTABLE AND CO., LTD., announce the following books of science:—"The Flying Machine from an Engineering Standpoint," F. W. Lanchester (the James Forrest Lecture, 1914, including a discussion concerning the Theory of Sustentation and the Expenditure of Power in Flight); "Some Modern Methods of Ventilation, with Special Reference to Public Buildings," R. Grierson, illustrated; "Mining and Mine Ventilation," J. J. Walsh, illustrated; "Practical Surveying," E. McCullough, illustrated; "Colour and its Applications," M. Luckiesh, illustrated; "Atoms," J. Perrin, translated by D. L. Hammick, illustrated; and a new and enlarged edition of "Manual of Reinforced Concrete," C. F. Marsh and W. Dunn.

OUR ASTRONOMICAL COLUMN.

PONS-WINNECKE'S COMET AND THE METEORIC SHOWER OF JUNE 28.—Mr. Denning writes:—"That the remarkable display of June 28 was due to the earth passing through or very near a cometary orbit appears highly probable. The elements of the meteoric shower present some resemblances to those of Pons-Winnecke's comet of 1819, which has a period of about 5·8 years, and last reached perihelion on September 1, 1915. Any meteoric shower connected with Pons-Winnecke's comet, though not visible in past years, may well be perceptible in future times. In 1869 the perihelion distance was 0·7815, or about 21½ millions of miles inside the earth's orbit, but in 1915 the P.D. had increased to 0·9725, or only 4 millions of miles inside our orbit. Planetary perturbations have effected changes in the orbital elements of the comet, and brought it so near to us at one section that a meteoric *rencontre* seems very likely."

DIFFERENTIAL MEASUREMENT.—Mr. H. H. Plaskett has made an interesting study of some questions involved in measures of the distance between a pair of lines with the object of tracing the origin of differences found when different observers measure the same spectrograms, with special reference to spectrographic determinations of the solar rotation (Journal Roy. Ast. Soc. of Can., vol. x., No. 5). He finds the chief source of these differences is the "attitude" of the observer, and defines two modes of measurement, the "attentive" and the "automatic," according as the measures are made under the influence of prepossessions or otherwise. It must suffice to add that the automatic mode is found to possess the desirable advantages of speed, accuracy, and economy of effort, but is marred by high fortuitous error (apparently, greater p.e.). Mr. Plaskett is of the opinion that the highest accuracy can only be attained in replacing differential measures by determinations of changes of wavelength with the help of standard absorption lines. A very successful application of these results has already been made at Ottawa (NATURE, May 18).

WAVE-LENGTHS IN THE IRON SPECTRUM.—Interferometer measures of the wave-lengths of some 400 lines in the spectrum of the iron arc in the region covered by the international secondary standards have been made by Messrs. Burns, Meggers, and Merrill in continuation of the revision of wave-lengths undertaken at the United States Bureau of Standards (Scientific Paper No. 274). The poles used were either of electrolytic or Norwegian iron, and only iron lines were measured. The reductions were based on the international secondary standards, and the final wavelengths were corrected by means of a smoothed curve obtained by plotting the differences between observed and normal wave-lengths of the standard lines. The mean difference is stated to be about one part in four millions. Three interferometers have been used in measuring each line, and, in addition to the work on wave-lengths, considerable attention has been devoted to observations of the physical characteristics of the lines. Thus, more than five hundred lines have been divided into four groups according to the limiting path difference at which interference is shown, and the data have been examined in connection with pole-effect, intensity, and pressure shifts. It appears that lines showing negative pole shift are never sharp; lines of faint or moderate intensity are sharper than strong lines, whilst the lines shifted by pressure are more likely to be broad than unaffected lines.